[redacted]

Pulse Duty Cycle Correction Factor

FCC 15.35(c) and ANSI C63.4:2003 Clause 13.1.4.2.

Calculation:

Average Reading = Peak Reading (dBuV/m) + 20 * log(duty cycle)

Where duty cycle correction is allowed, the following methods are employed to determine the correction factor:

1) Turn on the transmitter and set it to transmit the pulse train continuously.
2) Tune the spectrum analyzer (Agilent E4440A) to the transmitter frequency and set the resolution bandwidth wide enough to encompass all significant components of the signal of interest. Video bandwidth is set to the widest bandwidth available.
3) Set the spectrum analyzer SPAN to zero. Set the SWEEP to 100 ms. This will be used to demodulate and detect the pulse train.
4) Set the TRIGger to Video. Spin the data control wheel to move the green trigger threshold line to the middle of the pulse amplitude.
5) Set the TRIGGER DELAY (page 2 of the TRIG menu) to center the pulse in the display.
6) If able, adjust the transmitter controls, jumper wires, or software to maximize the transmitted duty cycle.
7) Measure the pulse width by determining the time difference between the rise and fall of the pulse. Use Marker Delta.
8) When the pulse train is less than 100 ms, including blanking intervals, calculate the duty cycle by averaging the sum of the pulse widths over one complete pulse train. When the pulse train exceeds 100 ms, calculate the duty cycle by averaging the sum of the pulse widths over the 100 ms width with the highest average value.
9) When the pulse train consists of long and short pulses measure samples of each with sweep times sufficiently small enough to allow measurement. Count the number of long and short pulses in one period or 100 ms. Multiply the number of long pulses times the long pulse width and the number of short pulses times the short time width. Sum the products.
10) The duty cycle is the value of the sum of the pulse widths in one period or 100 ms, divided by the length of the period or 100 ms. This should result in a decimal fraction between 0.10 and 0.99. The result is the duty cycle.
11) Multiply the logarithm (base 10) of the duty cycle by 20 to create the duty cycle factor. The duty cycle factor is then added to the peak detector reading and then compared to the average detector limit.

A)	Period (ms) =	100	(100 ms Maximum)
B)	Long Pulse (ms) =	.523	
C)	Nr. Of Long Pulses	100	
D)	Short Pulse (ms) =	.1935	
E)	Nr. Of Short Pulses	14	
F)	Duty Cycle Allowance	-5.19dB	(Maximum Allowance is 20 dB)

Representative Plots Located on Pages: ____________________

$$\text{Duty Cycle (F)} = 20 \times \log \left(\frac{\text{Nr. of Long Pulses} \times \text{Long Pulse} + \text{Nr. of Short Pulses} \times \text{Short Pulse}}{\text{Period}} \right)$$

SCS02013

Agilent 09:15:41 Apr 18, 2005

Δ Mkr1 100 ms
-39.16 dB

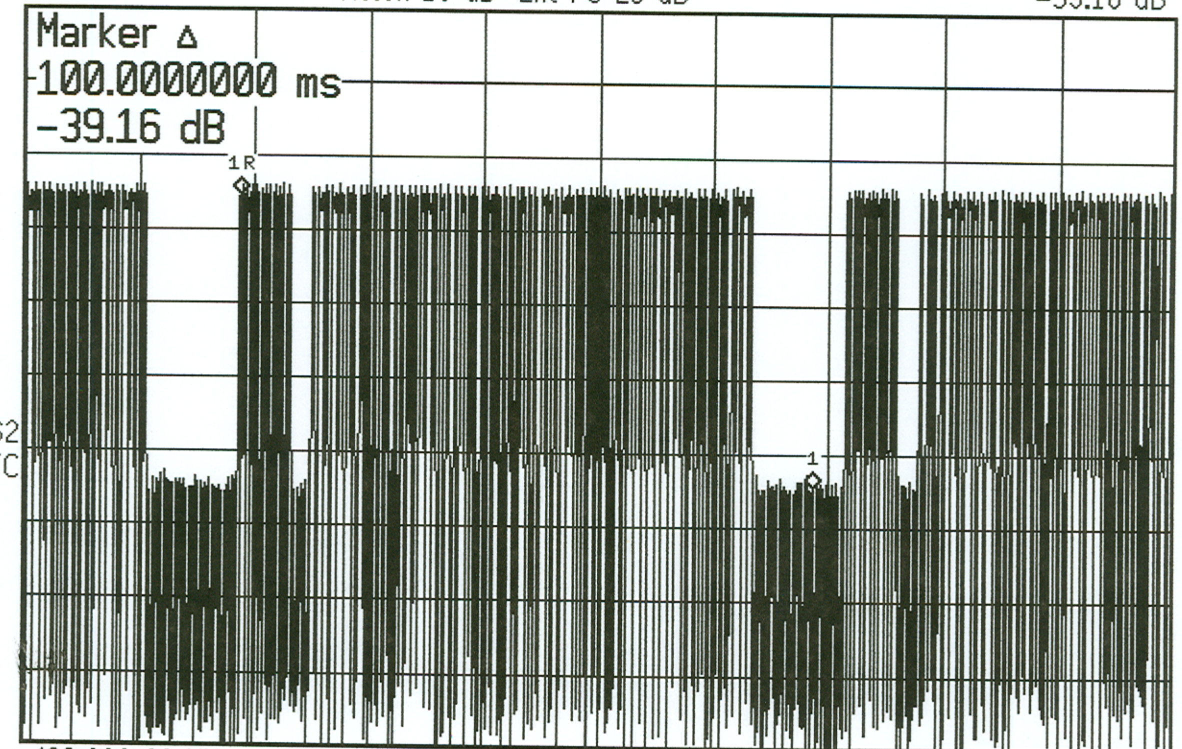
Ref -40 dBm   Atten 10 dB Ext PG 23 dB

Norm
Log
10
dB/

LgAv

V1 S2
S3 FC

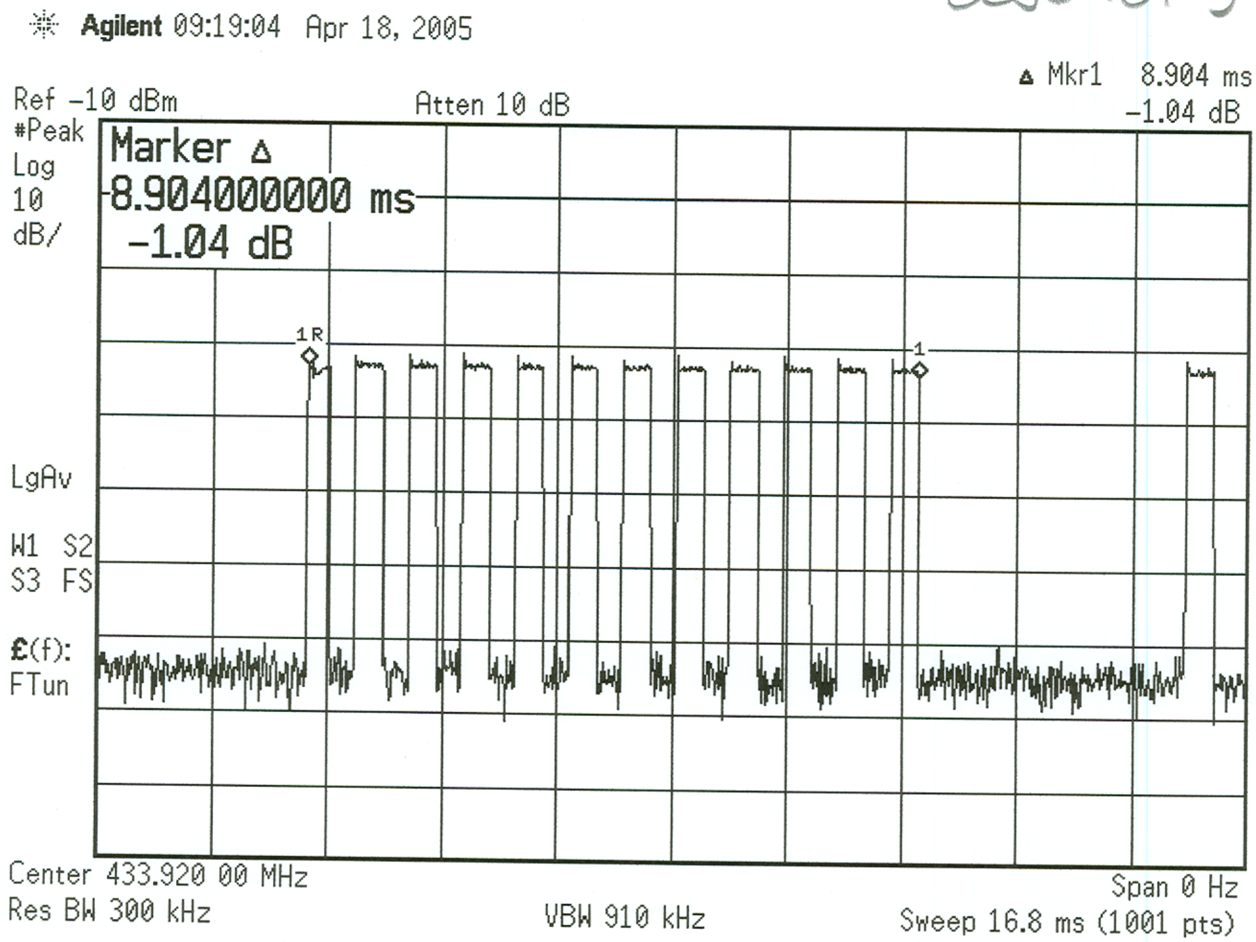
£(f):
FTun



Center 433.920 00 MHz   Span 0 Hz
Res BW 300 kHz   VBW 910 kHz   Sweep 200 ms (1001 pts)

Directed Elect

SCJ02013


Agilent 09:19:04 Apr 18, 2005
Δ Mkr1 8.904 ms
-1.04 dB
Ref -10 dBm
Atten 10 dB
#Peak
Log
10
dB/
Marker Δ
8.904000000 ms
-1.04 dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 433.920 00 MHz
Res BW 300 kHz
VBW 910 kHz
Span 0 Hz
Sweep 16.8 ms (1001 pts)